Remarks

Claim 1 has been amended to specify that at the contention point in question the multicast connection splits into several streams (see, for example, Figure 2).

The Examiner has rejected the claims over the newly cited reference to Kalampoukas as anticipated under 35 USC 102(b). In order to meet the test of anticipation, it is essential that

> "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co.* , 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

The Federal Circuit has also stated:

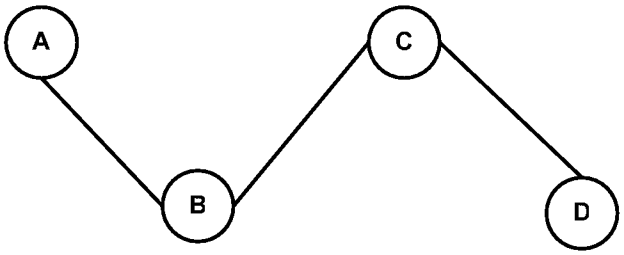
"An anticipating reference must describe the patented subject matter with sufficient clarity and detail to establish that the subject matter existed and that its existence was recognized persons of ordinary skill in the field of the invention". ATD Corp. v. Lydall, Inc., *48 USPQ 2d 1321.* (Emphasis added)

It is respectfully submitted that the newly cited reference fails to meet this test.

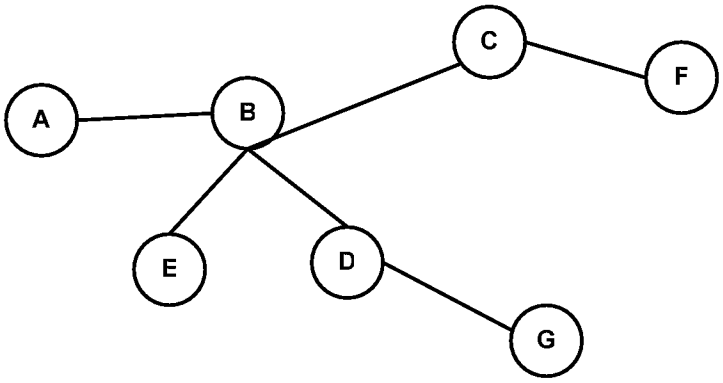
The present invention is concerned with rate control in multicast connections. In such connections, as illustrated in Figure 2, a single virtual connection is established between a source and multiple destinations. The multicast connection initially consists of a single cell/packet stream that splits at contention points into multiple streams. The point of multicasting is that, unlike broadcasting, the cells/packets are only copied where necessary to ensure the most efficient delivery to the multiple destinations. The invention is concerned with controlling the rate of a particular multicast connection at a contention

point has to take into account the needs of other connections at the contention point (which could be either unicast or multicast). The multicast connection is considered a single connection, even though it splits into multiple cell streams. The invention is based on the fact that at each such contention point where the multicast connection splits into multiple streams, a single ER calculation for that connection is performed, which rather than being based on some aggregate rate is based on the rate for the slowest stream of the multicast connection. Such an approach considerably simplifies the calculation. For example, if several multicast connections passed through a single contention point, with each multicast connection having several thousand destinations, the amount computation involved in taking all the streams could be very large. By basing the calculation on the stream with the lowest rate, a substantial reduction in complexity can be achieved.

Kalampoukas is primarily concerned with unicast connections, wherein a connection extends over a series of succesive links. In accordance with Kalampoukas, the rate for that connection is based on the rate at the bottleneck.



For example, in the above diagram according to Kalmpoukas, if a connection extends from node A to node D, and a bottleneck occurs at node C, the node C will be used for the rate calculation.



The invention on the other is concerned with a multicast connection, where say a single multicast connection extends from node A to node B, and then splits at node B into different streams directed toward nodes E, F, G, each of which may be connected to multiple CPEs. The rate for the single multicast connection is based on the rate for the slowest stream leaving contention point at node B. There could be further connection points along the paths of the individual streams, where there split further, and these would be treated in the same way.

This is clearly to the same as selecting the node in a connection where a bottleneck occurs, as taught by Kalampoukas.

Kalampoukas describes at col. 6, line 58 how his congestion control method can also be applied to multicast circuits (connections). It is clear from this discussion that Kalampoukas teaches precisely the method the invention seeks to avoid, and therefore Kalampoukas suffers from precisely those disadvantages the invention seeks to overcome. Kalampoukas teaches at col. 7, line 8 – 10 that "The process of combining the returned RM cells for the several multicast paths can be performed by well known prior art methods" (emphasis added), and at col. 7, lines 11 – 15 that "we require the switch to find the minimum ER value in the backward direction from among those cells in the

multicast flows, that minimum ER value to be placed in the combined RM cell which is then forwarded in the backward direction" (i.e. returned to the source). In other words, Kalampoukas teaches, in a manner that is consistent with the acknowledged prior art, that you have to calculate the ER value for each flow. As pointed out in the present application, that can be impractical for a multicast connection with a large number of different destinations. In accordance with the present invention, the ER calculation is performed only on the slowest stream of the multicast connection at the contention point, and that value is returned to the source.

Another way of looking at it is that the present invention teaches how to perform the ER calculation at the bottleneck in Kalampoukas in the case where the connection is a multicast connection. Kalampoukas is completely silent as to the idea of only performing the calculation on the slowest stream.

In the applicant's respectful submission, Kalampoukas has nothing more than passing resemblance to the present invention, and a closer analysis shows that he clearly does not teach its essence and the claim limitations set forth in claim 1. On the contrary, Kalampoukas teaches the acknowledged prior art method in relation to multicast connections.

It is believed that the application is in condition for allowance for essentially the same reasons as before. Allowance and reconsideration are therefore earnestly solicited.

Respectfully submitted,

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